

# Preliminary Investigation of Geometer Moths (Insecta: Heterocera: Geometridae) of Malabar Region (Taliparamba Taluk), Kannur, Kerala

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## ARTICLE DETAILS

### Article History

Published Online: 10 October 2018

### Keywords

Geometridae, Geometer moths, Taliparamba, Diversity

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## ABSTRACT

Some opportunistic observations on the diversity of Geometer moths have been done from August 2015 to September 2016 in Taliparamba region. We have identified 35 genera and 38 species of Geometer moth belongs to 5 subfamilies of Geometridae. Of these 28 species of Geometer moths are new record to Malabar region. From our study we come to a conclusion that Taliparamba is a suitable habitat for these highly sensitive families of moths.

## 1. Introduction

Insects are one the most diverse groups of organisms that constitute more than two-thirds of identified species of all animals on earth. They are incredibly numerous and play key roles as prey, predator, pollinator and decomposer in both natural and man-made habitats. Some insect groups are increasingly drawing the attention of biologists worldwide due to their ability to rapidly change with time in response to hosts, geographical distribution, environmental factors, ecology and behavior, genetics, insecticides, etc. Of these one of an important groups are the insect that are coming in the order Lepidoptera. Lepidoptera is one of the largest orders of class Insecta. The order Lepidoptera comprises both Butterflies (Raphalocera) and Moths (Heterocera). Both of them are known to be as highly sensitive organisms. They are highly sensitive to the environmental changes. Of these the moths are less studied and they are known less in common people because of their nocturnal behavior. Most of the moths are nocturnal in nature. Only a less are known to be diurnal.

The super family Geometroidae is one of the largest groups among the macrolepidopteran families in tropical and subtropical countries includes dominating families like, Uranidae, Geometridae, and Drepanidae etc. The geometer moths or the family Geometridae is the second largest among all the butterflies and moths, with about 35,000 species worldwide. Geometer moths live in vegetated habitats, especially those with woody plants available, and have a wide distribution throughout the world. It is a highly diverse family of moths. The family name Geometridae comes from the Greek *geo*, meaning earth, and *metron*, meaning measure. Most of the species of the moths that are coming under this family have a geometrid shape. That makes them differ from other group of moths. These groups of moths are highly sensitive to the environmental changes especially the caterpillars. David Wagner notes, in *Caterpillars of Eastern North America*, that their "body color and form can be influenced by diet as well as the lighting of a given caterpillar's surroundings." Here in this present study we tried to picturize the diversity of the family Geometridae of Taliparamba.

## 2. Methodology

### Collection method

The sheet method was used, which allows collection of all the specimens individually without any damage. A white cloth sheet (10'X6') was hung between two vertical poles in such a way that it touched the surface and extended forward over the ground slightly away from direct source of light placed at such a point that the whole sheet from edge to edge brightly reflected the light. A 160 watt mercury vapour lamp was used as a light source through the night [3]. Moths started collecting on the sheet just after sunset between 6 to 11pm, after that the abundance of moths slowly declined.

The collected moths were killed by using ethyl acetate, pinned, stretched and preserved in Airtight insect box, having naphthalene balls as fumigant the methodology discussed by workers such as Mikkola (1986) [5] as well as Landry and Landry (1994) [6] were followed for the pinning, stretching and preservation of specimens. The standard techniques given by Zimmerman (1978) [7] have been followed for wings. With regard to systematic arrangement of families Heppner classification for Lepidoptera (1998) were followed [8].

Each specimen was provided with a label indicating the scientific name, locality and date of collection. The specimens were then identified up to species level with the help of identified specimens and available literature by T.R.D Bell and F.B.Scott (1937) [9], and other published literatures [10].

## 3. Results and Discussion

Through this study, we have increased our knowledge regarding the diversity of Geometer moths inhabiting in Taliparamba. This study was carried out in Taliparamba between August 2015 to September 2016. Totally 326species of moths belonging to 28 different families were recorded. Family Geometridae was the one of the interesting family in our study area. During the study 35 genera and 38 species belonging to 5 subfamilies of Geometridae was identified (Table 1)[4]. Of these 28 Species are new records to Malabar.

According to our collection, Geometriinae was the dominant subfamily (Table2) (Fig1). During our study we have collected a lot of interesting geometer moths; we have studied their behaviour, their biology (especially the biology of *Dysphania percota*, day flying moth).

Most of the geometer moths are seen blend in to the background during its resting time and often tangled with thin wavy patterns on their wings. Geometer moths may be easiest to identify in the larval stage because of their unusual appearance. Many geometer moth larvae bear cryptic markings that resemble plant parts. The caterpillars bear just two or three pairs of prolegs near their hind ends, instead of the five pairs found in most butterfly or moth larvae. With no legs in the middle section of its body, a Geometer moth caterpillar moves in a looping fashion. It anchors itself with the rear prolegs, extends its body forward, and then pulls its hind end up to meet its front end [2].

For identifying these moths one of an important character has taken in consideration was its wing venation. In this case the sub costal vein (Sc) of the hind wing is bends sharply toward the base and the cubitus of the forewing appears to divide into three branches (Fig 2), [2]. Geometer moth larvae feed on plants, with most species preferring woody trees or shrubs over herbaceous plants. It was seen that the geometrid moth *Dysphania percota* as the serious pest of *Carallia brachiata* (Rhizophoraceae). It completed its whole life cycle in this host plant. *Dysphania percota* was seen throughout the year. From our present study we have concluded this species as a most adaptive geometer moth.

This present study no means comprehensive, it aims to provide an insight into the moth diversity of Taliparamba and the surrounding areas, and act as a baseline for more detailed and comprehensive studies of the moths of this region.

**Table 1: List of species of geometer moths identified in Taliparamba region.**

Family: Geometridae		Status
Subfamily: Ennominae		
1	<i>Biston suppressaria</i> Guenee, 1857	C
2	<i>Biston</i> sp	U
3	<i>Boarmia</i> sp.	U
4	<i>Chiasmia eleonora</i> Hubner, 1818	C
5	<i>Chiasmia nora</i> Walker, 1861	C
6	<i>Chiasmia emersaria</i>	R
7	<i>Chiasmia</i> sp	U
8	<i>Corymica deducta</i>	U
9	<i>Dalima patularia</i> Walker, 1860	U
10	<i>Heterostegane subtessellata</i> Walker, 1863	U
11	<i>Hyperythra lutea</i> Stoll, 1781	U
12	<i>Hypomecis</i> sp	C
13	<i>Hyposidra talaca</i> Walker, 1860	C
14	<i>Hyposidra</i> sp	U
15	<i>Petelia cf immaculata</i> Hampson, 1893	U
16	<i>Pingasa cf. pseudoterpnaria</i> Guenee, 1858	C
Subfamily: Geometrinae		
17	<i>Agathia succedanea</i>	C

18	<i>Agathia Lycaenaria</i>	R
19	<i>Agathia laetata</i>	C
20	<i>Ascotis imparata</i> (Walker)	R
21	<i>Anisephyra</i> sp	R
22	<i>Comibaena cassidara</i> Guenee, 1857	R
23	<i>Corymica deducta</i> Walker, 1866	U
24	<i>Comostola</i> sp	U
25	<i>Dysphania percota</i>	C
26	<i>Eumelea ludovicata</i>	C
27	<i>Hemithea cf. constipunctata</i> Moore, 1867	U
28	<i>Hemithea ochrolauta</i> Warren, 1894	U
29	<i>Lomographa vestaliata</i> Guenee, 1858.	R
30	<i>Naxa textilis</i>	C
31	<i>Patalene</i> sp	R
32	<i>Pelagodes quadraria</i> Guenee, 1857	U
33	<i>Pingasa rectangulata</i> Linnaeus, 1758	C
34	<i>Tanaoctenia</i>	R
35	<i>Thalassodes</i> sp.	U
36	<i>Ornithospila avicularia</i> Guenee, 1857	R
Subfamily: Larentiinae		
37	<i>Pasiphila rectangulata</i> Linnaeus, 1758	R
Subfamily: Oenochrominae		
38	<i>Eumelia rosalia</i> Stoll, 1781	C
Subfamily: Sterrhinae		
39	<i>Scopula subpunctaria</i> Herrich-Schaffer, 1847	U
40	<i>Scopula pulchellata</i> Fabricius, 1794	U
41	<i>Scopula</i> sp.	C
42	<i>Traminda mundissima</i> Walker, 1861	U

Status: C - Common (more than 20 specimens recorded); U - Uncommon (more than 5 but fewer than 20 specimens recorded); R - Rare and singletons (single and fewer than 5 specimens recorded).

**Table 2: Number of species identified in subfamilies of Geometridae**

Subfamily	Number of species collected
Ennominae	15
Geometrinae	19
Larentiinae	1
Oenochrominae	1
Srerrhinae	4

**Fig 1: Number of species in subfamilies of Geometridae**

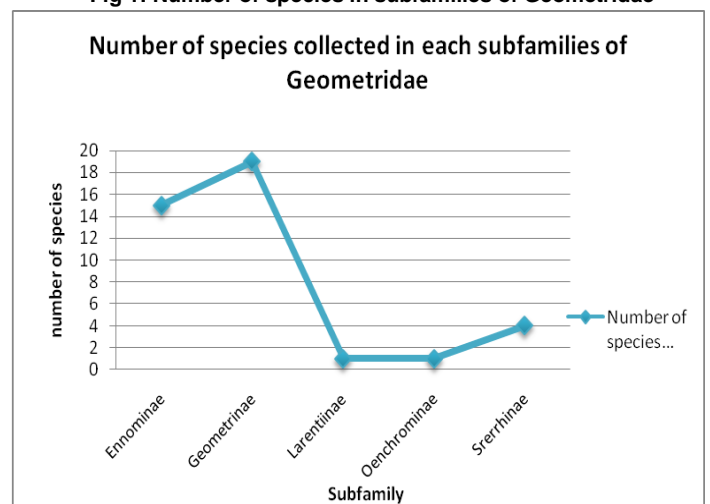
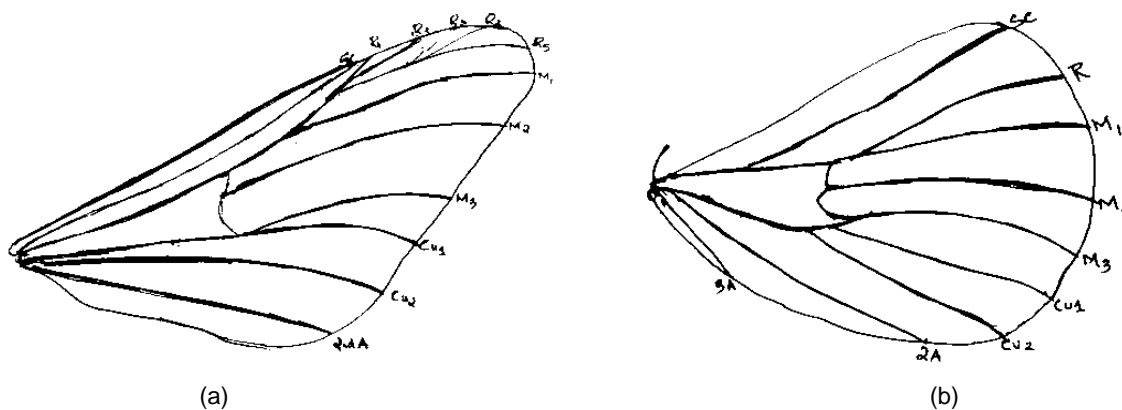


Fig 2: Wing venation of the family Geometridae

Fig 2: (a) & (b) Forewing & Hind wing of *Dysphania percota* (Geometrinae)

The cubitus of the forewing appears to divide into three branches and sub costal vein (Sc) of the hind wing is bends sharply toward the base and the cubitus of the forewing appears to divide into three branches.

### Acknowledgement

We are thankful to the Ministry of Environment, Forest and Climatic changes, for the support. We are grateful to, the principal of Sir Syed College, Taliparamba and the management for their grate support and encouragement in this study.

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